

Submitted to

Los Angeles County

Conceptual Design Final Report

Gateway Cities Traffic Signal Synchronization
And Bus Speed Improvement Project

August 2005

Version 2

**National Engineering
Technology Corporation**

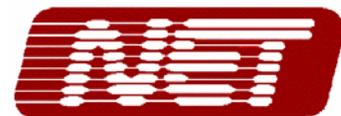


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Table 1-1: Revision History

Version	Date Submitted	Changes by	Comments
Draft Version 1	March 2004		
Version 1	July 2005	NET Corp.	
Version 2	August 2005	NET Corp.	

1 INTRODUCTION

This executive summary gives a complete, but brief overview of the Conceptual Design for the Gateway Cities Traffic Signal Synchronization and Bus Speed Improvement Project that is proposed to be designed and deployed. It concentrates on the final recommendations for an initial phase that is budget constrained.

1.1 System Overview

The Conceptual Design recommended a system for the I-105 Corridor project that includes the following functionality for each participant agency:

- The ability to monitor and manage the signals within the project area.
- The ability to view and control cameras located throughout the corridor.
- The ability to control Changeable Message Signs located within their jurisdiction.
- The ability to monitor traffic signals throughout the sub region (though the Information Exchange Network)
- The ability to enter and monitor active events throughout the sub region (though the Information Exchange Network).

To accommodate the systems, facility improvements at each agency will be designed and implemented. For most cities this includes minor modifications to existing spaces to locate the computers and communications equipment. For one city the improvements will also include video display equipment.

1.3 I-105 Corridor Project Overview

The Los Angeles County Department of Public Works (LACDPW) enlisted the services of NET Corporation to design the recommended ITS improvements. This project is entitled the *Gateway Cities Traffic Signal Synchronization and Bus Speed Improvement Project (or The I-105 Corridor Project)*, which consist of ten phases implementing five major recommended components. The components of the Project are:

- Traffic Signal Management and Control System (TSMACS)
- Sub-Regional Traffic Management Center (Sub-Regional TMC) and Local City Control Sites (LCCS)
- Traveler Information and Surveillance System (TIASS)
- System Components Integration
- Communications System

Installation of the five components identified in the I-105 Corridor Project will provide an Intelligent Transportation System Corridor for the I-105 Area. The infrastructure deployed for the I-105 Corridor Project will be integrated with the Sub-Regional and County TMCs through the use of the Information Exchange Network (IEN) for traffic signal coordination.

The I-105 Corridor project area consists of Firestone Boulevard, Rosecrans Avenue, and Imperial Highway which run parallel to I-105 and four perpendicular arterials, Paramount Boulevard, Lakewood Boulevard, Bellflower Boulevard, and Studebaker Road. The arterials cross several local, and two regional, jurisdictional boundaries. There are a total of nine local jurisdictions, which are cumulatively referred to as the Gateway Cities. These include

Bellflower, Compton, Downey, La Mirada, Lynwood, Norwalk, Paramount, Santa Fe Springs, and South Gate. The two regional jurisdictions are Los Angeles County (LA County) and Caltrans District 7 (Caltrans D7). There are a total of 194 signalized intersections within the I-105 Corridor project area. The I-105 Corridor project area is shown in Figure 1-1.

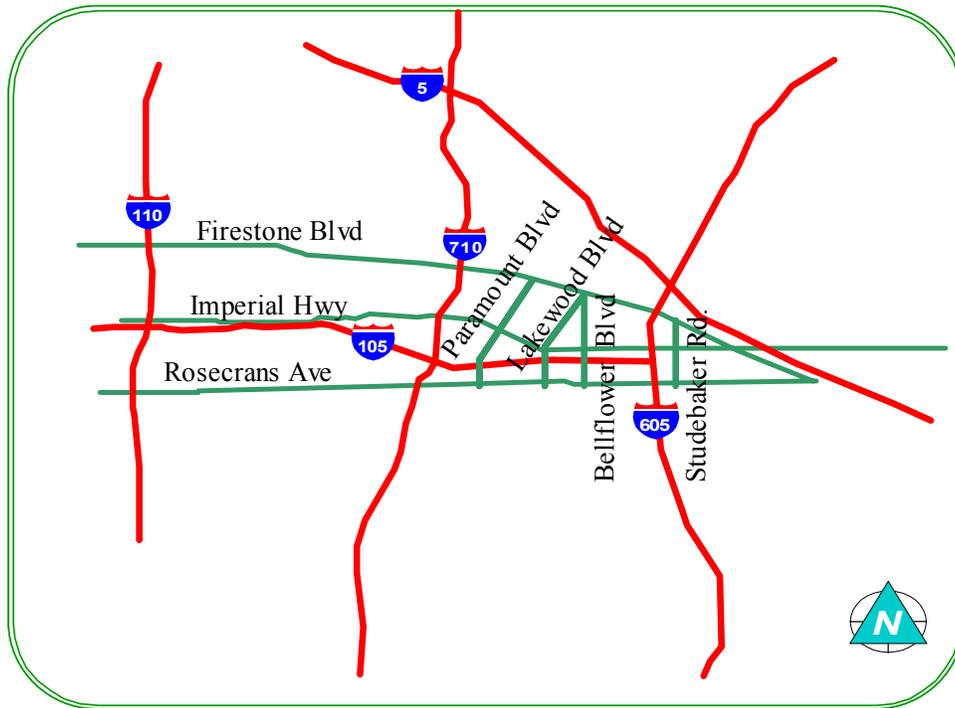


Figure 1-1: I-105 Corridor Project Area

2 RECOMMENDED SYSTEM ARCHITECTURE DESIGN

This section presents the recommended view of the system architecture for the I-105 Corridor project area.

2.1 System Architecture Description

System architectures identify high-level components of a system and how they are interrelated. These components are referred to as configuration items. A configuration item can be a hardware component (HCI), a software component (SCI), or a combination of both that satisfies an end use function and is designated for separate configuration management by the user (supporting subsystem). Figure 2-1 depicts the recommended system architecture for the I-105 Corridor project.

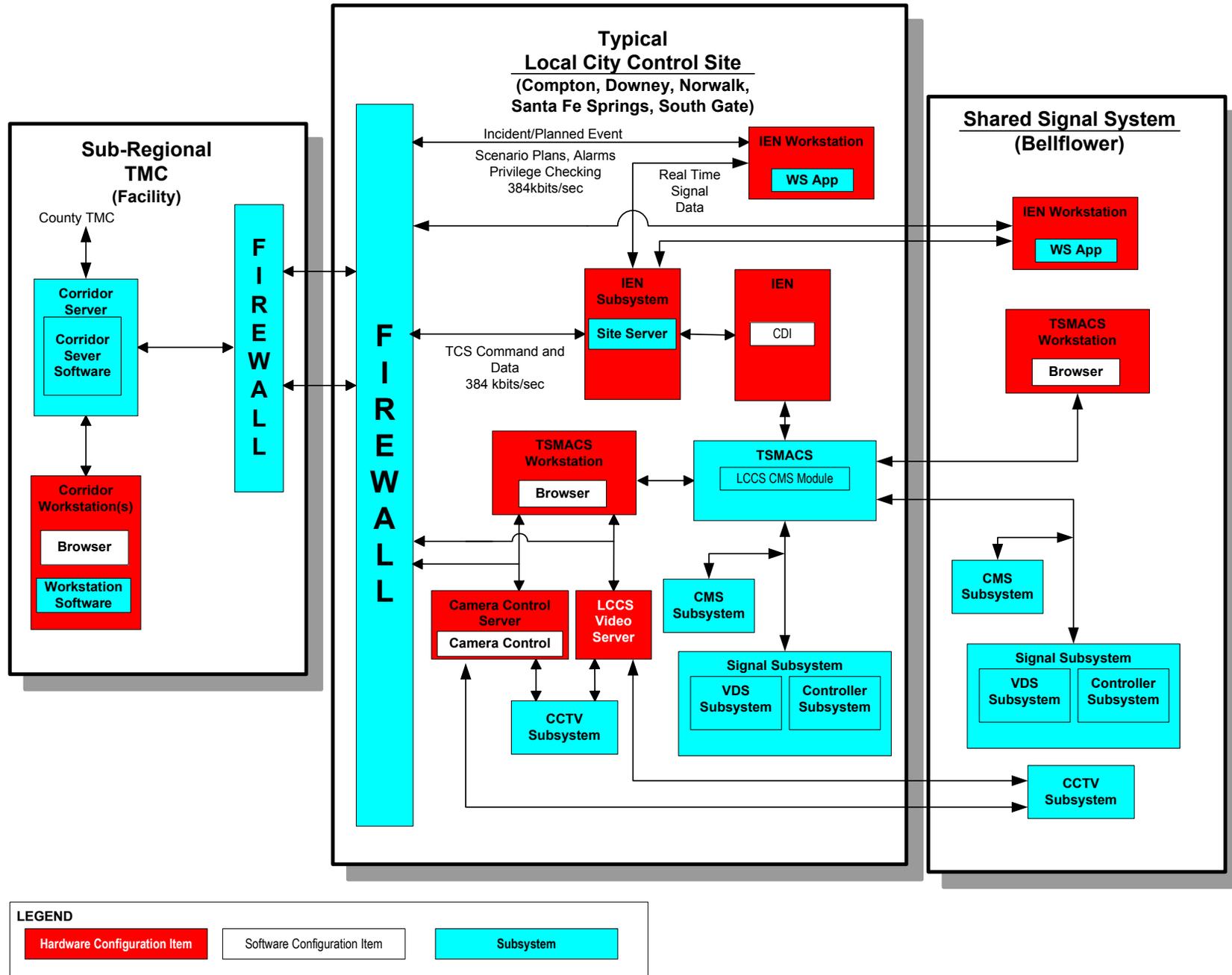


Figure 2-1: Recommended System Architecture

3 INITIAL SYSTEM DEPLOYMENT

Budget constraints limit Traffic Signal Systems to be deployed and several Cities will be sharing a signal system. In this configuration, signals and changeable message signs from one city will be connected to a system in another city. Each City will have a Traffic Signal Workstation to access and control their signals and an IEN workstation to view the signals in other jurisdictions. Budget constraints also limit the number of cameras and changeable message signs that will be deployed. Fiber optic cables will be deployed in only limited areas. Signals and signs in areas outside the fiber coverage will utilize wireless communications. Closed circuit television cameras outside the fiber limits will utilize leased DSL. The total cost for the deployment is estimated to be \$10.2 million.

3.1 Sub-Regional TMC Location

The Sub-Regional TMC will be co-located at the LA County facility.

3.2 Traffic Signal System

The following cities will receive signal systems: Downey, Norwalk, and Santa Fe Springs. The City of Compton is procuring a signal system through a separate project. The City of South Gate has an existing system that will be upgraded as part of this project. Video and camera control servers will be located in selected cities that have Traffic Signal Systems in support of CCTV systems. The cities of Lynwood and Bellflower will share a signal system with the City of Downey and the City of Paramount will share a system with the City of Santa Fe Springs. The City of La Mirada will share the signal system with LA County.

3.3 CCTV Camera System

CCTV cameras use surveillance technology for displaying traffic images from the field. The CCTV system consists of field cameras, camera control units, video decoders/encoders (if required for transport), and video control equipment. CCTV imagery data is required for real-time verification of incidents and congested traffic conditions. The images can be displayed at the Traffic Management Center (TMC), and at Local City Control Site (LCCS) workstations shared through the I-105 Corridor and/or stored in a digital video server, which is accessible through the Internet. The recommended CCTV camera technology is DSP with mechanical zoom lens, pressurized enclosures, and pan/tilt drive units.

3.4 Changeable Message Sign (CMS) System

Changeable Message Signs display traveler information messages to the motoring public. The fixed CMS technology recommendation is for single color LED signs. The table below provides a listing of the locations selected for fixed CMS. It should be noted that due to budget constraints, deployment of CMS would be left for a future phase.

Table 3-1: Recommended CMS Locations

Project Arterial	Direction	In Advance Of	Jurisdiction
ZONE 1			
Paramount Blvd	Northbound	I-105	Paramount
Lakewood Blvd	Northbound	I-105	Paramount
Bellflower Blvd	Northbound	I-105	Bellflower
ZONE 2			
Rosecrans Ave	Freeway	I-710	Paramount
Rosecrans Ave	Freeway	I-710	Paramount
ZONE 3			
Imperial Hwy	Eastbound	I-605/I-105	Norwalk

3.5 Vehicle Detection System (VDS)

The VDS is responsible for gathering vehicle traffic information consisting of volume, occupancy and speed. The system design incorporates the recommendation for the Vehicle Detection Systems (VDS) to un-gang the existing advance detection so that it can be used effectively for VDS purposes.

3.6 Communication System

The concept of communications architecture refers to how the communications devices physically connect field devices and facilities for communication purposes. The following are the devices and systems requiring communication:

- The field devices (i.e. traffic signals, CMS, and CCTV),
- The ten Local City Control Sites and one Sub-Regional TMC.

Within the Local City Control Sites the System Architecture defines two systems:

- The IEN Subsystem which is required to communicate with Sub-Regional TMC systems and other Local City Control Sites.
- Within the Sub-Regional TMC, the Corridor Server (more specifically the IEN Subsystem) will communicate with each Local City Control Site, as well as the County TMC and other ITS systems.

3.7 Summary of Initial Deployment Inventory

Table 3-2 summarizes the proposed initial deployment inventory and associated cost for each agency as described in Section 4. Appendix A includes the signal locations by City.

Table 3-2: Summary of Initial Deployment Inventory

No.	Agency	Signal System Server	Video Server	Traffic Signals (Wireless)	Traffic Signals (Cable-based)	CCTV (DSL)	CCTV (Cable-based)	CMS	Fiber (mi.)	Cost
1	City of Downey	1	1	12	29	----	5	----	2.9	\$1,659,990
2	City of Norwalk	1	1	19	16	4	3	1	3.0	\$2,214,247
3	City of Santa Fe Springs	1	1	2	2	1	----	----	1.7	\$911,669
4	City of Paramount	----	----	7	----	1	----	4	----	\$795,816
5	City of Compton	1	----	18	----	2	----	----	----	\$971,244
6	City of Lynwood	----	----	13	----	2	----	----	----	\$401,448
7	City of La Mirada	----	----	11	4	----	2	----	2.2	\$952,368
8	City of South Gate	1	----	4	14	3	----	----	0.4	\$514,820
9	City of Bellflower	----	----	5	----	2	----	1	----	\$688,608
10	LA County	1	----	20	4	3	1	----	----	\$1,046,664
	TOTAL	6	3	111	69	18	11	6	10.2	\$10,156,874

4 INITIAL DEPLOYMENT BY AGENCY

The following summarizes the deployed systems by agency.

4.1 City of Downey

Table 4-1: City of Downey Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	1	Downey LCC (City Hall)	Network based
CCTV Cameras	5	Firestone & Paramount Firestone & Lakewood Imperial & Paramount Imperial & Lakewood Imperial & Bellflower	Fiber Optic Cable Fiber Optic Cable Fiber Optic Cable Fiber Optic Cable Fiber Optic Cable
Fixed CMS	0	N/A	N/A
Digital Video Server	1	Downey LCC (City Hall)	Network based

The Downey LCCS DSL communication design requires:

Center-to-Field

- Two T1 circuits to support the eight incoming CCTV camera video signals at 384 Kbps per camera.

Center-to-Center

- Two T1 circuits to support eight outgoing video signals at 384 Kbps per video signal to other LCCS
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

Fiber Locations

The I-105 Corridor Project proposes installing new fiber optic cable in the City of Downey along the following route:

- Imperial Highway from Garfield Avenue to Bellflower Blvd.

4.2 City of Norwalk

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of Norwalk. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-2: City of Norwalk Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	1	Norwalk LCC	Network based
CCTV Cameras	7	Firestone & Studebaker Firestone & Imperial Firestone & Pioneer Imperial & Bloomfield Rosecrans & Studebaker Rosecrans & Pioneer Rosecrans & Carmenita	Fiber Optic Cable Fiber Optic Cable DSL Fiber Optic Cable DSL DSL DSL
Fixed CMS	1	Imperial Hwy (Eastbound in advance of I-605/I-105)	Wireless (2.5G)
Digital Video Server	1	Norwalk LCC	Network based

The Norwalk LCCS DSL communication design requires:

Center-to-Field

- 3 T1 circuits to support the 11 incoming CCTV camera video signals at 384 Kbps per camera.

Center-to-Center

- 3 T1 circuits to support 12 outgoing video signals at 384 Kbps per video signal to other LCCS.
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

Fiber Locations

The I-105 Corridor Project proposes installing new fiber optic cable in the City of Norwalk along the following routes:

- Imperial Highway from Firestone Blvd. to Ralph's Driveway
- Firestone Blvd. from I-605 SB Off-Ramp to Imperial Highway

4.3 City of Santa Fe Springs

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of Santa Fe Springs. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-3: City of Santa Fe Springs Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	1	Santa Fe Springs LCC	Network based
CCTV Cameras	1	Rosecrans & Valley View	DSL
Fixed CMS	0	N/A	N/A
Digital Video Server	0	Share with Norwalk LCC	DSL

The City of Santa Fe Springs communications infrastructure design for the field consists of a fiber optic cable and wireless based design for the traffic signals for the city. Two intersections on Imperial Highway will be fiber based and two intersections on Rosecrans Avenue will be wireless based. The video transmission will use high-speed DSL to transmit from the field and will share the digital video server located at Norwalk.

The communication between the Santa Fe Springs LCC and the Norwalk LCC will be over fiber optic cable. The City of Santa Fe Springs has planned a fiber optic cable deployment for Telegraph Road under a separate project initiative. The proposed deployment is targeted for Telegraph Road from Paramount Boulevard to Carmenita Road.

The DSL bandwidth requirement for Santa Fe Springs:

Center-to-Field

- 1 x 384Kbps circuit for a CCTV camera from the field to the video server located at the City of Norwalk.
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

Fiber Location

- Telegraph Road, Paramount Boulevard to Carmenita Road. (Under I-5 telegraph Road Project.)

4.4 City of Paramount

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of Paramount. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-4: City of Paramount Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	0	Share with Santa Fe Springs	DSL
CCTV Cameras	1	Rosecrans & Paramount	DSL
Fixed CMS	4	Paramount Blvd (northbound in advance of I-105)	Wireless
		Lakewood Blvd (northbound in advance of I-105)	Wireless
		Rosecrans Ave (freeway in advance of I-710)	Wireless
		Rosecrans Ave (freeway in advance of I-710)	Wireless
Digital Video Server	0	Share with Downey	DSL

The DSL bandwidth requirement for Paramount:

Center-to-Field

- 1 x 384Kbps circuit for a CCTV camera from the field to the video server located at the City of Downey.

Center-to-Center

- 1 x 384Kbps circuit for traffic signal system data communications between the Paramount LCCS and the Downey LCCS
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

4.5 City of Compton

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of Compton. The table below provides a more detailed view of the deployment initiative targeted for the city. It should be noted that the City of Compton has funding for signal system improvements and the County is working in cooperation with the city on improvements.

Table 4-5: City of Compton Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
CCTV Cameras	2	Rosecrans & Wilmington	DSL
		Rosecrans & Long Beach Blvd	DSL
Fixed CMS	0	N/A	N/A
Digital Video Server	0	Share with Norwalk	DSL

Center-to-Center

- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

4.6 City of Lynwood

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of Lynwood. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-6: City of Lynwood Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	0	Share with Downey LCCS	DSL
CCTV Cameras	2	Imperial & Long Beach Blvd Imperial & Atlantic Blvd	DSL DSL
Fixed CMS	0	N/A	N/A
Digital Video Server	0	Share with Downey LCCS	DSL

The DSL bandwidth requirements for Lynwood:

Center-to-Field

- 2 x 384Kbps circuits for two CCTV cameras from the field to the video server located at the City of Downey.

Center-to-Center

- 1 x 384Kbps circuit for traffic signal system data communications between the Lynwood LCCS and the Downey LCCS
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

4.7 City of La Mirada

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of La Mirada. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-7: City of La Mirada Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	0	Share with LA County	DSL
CCTV Cameras	2	Imperial & Valley View Rd Imperial & La Mirada Blvd	Fiber Fiber
Fixed CMS	0	N/A	N/A
Digital Video Server	0	Share with Downey LCCS	Fiber

The DSL communication requirements for La Mirada:

Center-to-Center

- 1 x 384Kbps circuit for traffic signal system data communications between the La Mirada LCCS and LA County
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

4.8 City of South Gate

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of South Gate. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-8: City of South Gate Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	1	South Gate LCC	Network based
CCTV Cameras	3	Firestone & Long Beach Blvd Firestone & Atlantic Ave Firestone & Garfield Ave	DSL DSL DSL
Fixed CMS	0	N/A	N/A
Digital Video Server	0	Share with Norwalk	DSL

The DSL bandwidth requirements for South Gate:

Center-to-Field

- 3 x 384Kbps circuit for three CCTV cameras from the field to the video server located at the City of Norwalk.

Center-to-Center

- 1 x 384Kbps circuit for traffic signal system data communications between the South Gate LCCS and the Norwalk LCCS
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

4.9 City of Bellflower

The I-105 Corridor Project has identified several components as part of the deployment initiative for the City of Bellflower. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-9: City of Bellflower Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
Signal System	0	Share with Downey LCCS	DSL
CCTV Cameras	2	Rosecrans & Lakewood Blvd Rosecrans & Woodruff Ave S	DSL DSL
Fixed CMS	1	Bellflower Blvd (northbound in advance of I-105)	Wireless
Digital Video Server	0	Share with Downey LCCS	DSL

The DSL bandwidth requirements for Bellflower:

Center-to-Field

- 2 x 384Kbps circuits for two CCTV cameras from the field to the video server located at the City of Downey.

Center-to-Center

- 1 x 384Kbps circuit for traffic signal system data communications between the Bellflower LCCS and the Downey LCCS
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

4.10 Los Angeles County

The I-105 Corridor Project has identified several components as part of the deployment initiative for the County of Los Angeles. The table below provides a more detailed view of the deployment initiative targeted for the city.

Table 4-10: County of Los Angeles Field Deployment Inventory

Component	Qty	Location(s)	Communication Type
CCTV Cameras	4	Firestone & Compton Ave	DSL
		Imperial & Carmenita Rd	Fiber
		Rosecrans & Avalon Blvd	DSL
		Rosecrans & Atlantic Blvd	DSL
Fixed CMS	0	N/A	N/A
Digital Video Server	0	Share with Downey LCCS	DSL

The DSL communication requirements for LA County:

Center-to-Field

- 2 x 384 Kbps circuits for two CCTV cameras in the field to the video server located at the City of Downey

Center-to-Center

- 1 x T1 and 1 x 768 Kbps circuits to support a total of six simultaneous incoming video signals at 384 Kbps per video signal from the other LCCS.
- 1 x 384 Kbps circuit for symmetric, bi-directional data communications in support of IEN link

APPENDIX A – SIGNAL LOCATIONS BY CITY

Table A-1: Downey Signal and VDS Locations

Primary Street	Cross Street	Communication	Existing Detection		Ganged?
			Presence	Advanced	
Firestone Blvd	Old River School	Existing Fiber	All	Major	No
Firestone Blvd	Rives Ave	Existing Fiber	All	Major	No
Firestone Blvd	Paramount Blvd	Existing Fiber	Minor	All	No
Firestone Blvd	La Reina Ave	Existing Fiber	All	Major	No
Firestone Blvd	Downey Ave	Existing Fiber	All	Major	No
Firestone Blvd	Dolan Ave	Existing Fiber	All	Major	No
Firestone Blvd	Brookshire Ave	Existing Fiber	All	All	No
Firestone Blvd	Patton Rd	Existing Fiber	All	Major	No
Firestone Blvd	Lakewood Blvd	Existing Fiber	All	All	No
Firestone Blvd	Stonewood Ctr Dwy	Existing Fiber	All	Major	No
Firestone Blvd	Woodruff Ave N	Existing Fiber	All	Major	No
Firestone Blvd	Woodruff Ave S	Existing Fiber	All	Major	No
Firestone Blvd	Stewart & Gray Rd	Existing Fiber	All	Major	No
Imperial Hwy	Old River School Rd	Fiber	All	Major	Major
Imperial Hwy	Smallwood Ave	Fiber	All	Major	Major
Imperial Hwy	Paramount Blvd	Fiber	All	All	Major
Imperial Hwy	Orizaba Ave	Fiber	Minor	Major	Major
Imperial Hwy	Downey Ave	Fiber	Minor	All	Major
Imperial Hwy	Brookshire Ave	Fiber	Minor	Major	Major
Imperial Hwy	Barlin Ave	Fiber	Minor	Major	Major
Imperial Hwy	Lakewood Blvd	Fiber	All	All	No
Imperial Hwy	Clark Ave	Fiber	Minor	All	Major
Imperial Hwy	Ardis Ave	Fiber	Minor	Major	All
Imperial Hwy	Bellflower Blvd	Fiber	All	All	No
Imperial Hwy	Dunrobin Ave	Wireless	Minor	Major	Major
Imperial Hwy	Woodruff Ave	Wireless	All	All	All
Rosecrans Ave	Century Blvd	Wireless	N/A	N/A	
Rosecrans Ave	Lakewood Blvd	Wireless	All	All	
Lakewood Blvd	Bellflower Blvd.	Wireless	Minor	Major	
Lakewood Blvd	Cleta St.	Existing Fiber	Minor	Major	

Primary Street	Cross Street	Communication	Existing Detection		
			Presence	Advanced	Ganged?
Lakewood Blvd	Stewart & Gray Rd.	Existing Fiber	Minor	Major	
Lakewood Blvd	Alameda St.	Existing Fiber	Minor	Major	
Lakewood Blvd	Clark Ave.	Existing Fiber	Minor	Major	
Lakewood Blvd	Gardendale St.	Wireless	Minor	Major	
Bellflower Blvd	Stewart & Gray Rd.	Existing Fiber	All	All	Major
Bellflower Blvd	Foster Rd.	Wireless	Minor	Major	Major
Paramount Blvd	Brookmill Rd.	Wireless	Minor	Major	No
Paramount Blvd	Stewart & Gray Rd.	Wireless	All	All	
Paramount Blvd	Alameda St.	Wireless	Minor	Major	No
Paramount Blvd	Quill Dr.	Wireless	Minor	Major	No
Paramount Blvd	Gardendale St	Wireless	Minor	All	No

Table A-2: Norwalk Signal and VDS Locations

Primary Street	Cross Street	Communication	Existing Detection		
			Presence	Advanced	Ganged?
Firestone Blvd	Hoxie Ave	Fiber	All	Major	
Firestone Blvd	Studebaker Rd	Fiber	N/A	N/A	
Firestone Blvd	Albertson's Dwy	Fiber	N/A	N/A	
Firestone Blvd	Orr & Day Rd	Fiber	N/A	N/A	
Firestone Blvd	Imperial Hwy	Fiber	N/A	N/A	
Firestone Blvd	Woods Ave	Fiber	N/A	N/A	No
Firestone Blvd	Pioneer Blvd	Fiber	N/A	N/A	No
Firestone Blvd	San Antonio Dr	Fiber	N/A	N/A	
Imperial Hwy	Curtis & King Rd	Wireless	Minor	Major	Major
Imperial Hwy	Food 4 Less Dwy	Wireless	N/A	N/A	
Imperial Hwy	Studebaker Rd	Wireless	All	All	All
Imperial Hwy	Jersey Ave	Fiber	N/A	N/A	
Imperial Hwy	Pioneer Blvd	Fiber	All	All	All
Imperial Hwy	Kalnor Ave	Fiber	Minor	Major	Major
Imperial Hwy	Norwalk Blvd	Fiber	N/A	N/A	
Imperial Hwy	AVD Manuel	Fiber	Minor	Major	Major

Primary Street	Cross Street	Communication	Existing Detection		
			Presence	Advanced	Ganged?
Imperial Hwy	Volunteer Ave	Fiber	Minor	Major	Major
Imperial Hwy	Ralphs Dwy	Fiber	N/A	N/A	
Rosecrans Ave	Studebaker Rd	Wireless	All	All	Major
Rosecrans Ave	Harvest Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Flallon Ave	Wireless	N/A	N/A	All
Rosecrans Ave	Pioneer Blvd	Wireless	N/A	N/A	All
Rosecrans Ave	Clarkdale Ave	Wireless	N/A	N/A	All
Rosecrans Ave	Funston Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Norwalk Blvd	Wireless	N/A	N/A	All
Rosecrans Ave	Shoemaker Ave	Wireless	N/A	N/A	All
Rosecrans Ave	Carmenita Rd	Wireless	All	All	All
Studebaker Rd	Lyndora St.	Wireless	N/A	N/A	
Studebaker Rd	Littchen St.	Wireless	N/A	N/A	
Studebaker Rd	Foster Rd.	Wireless	All	All	
Studebaker Rd	Leffingwell Rd.	Wireless	Minor	Major	

Table A-3: Santa Fe Springs Signal and VDS Locations

Primary Street	Cross Street	Communications	Existing Detection		
			Presence	Advanced	Ganged?
Imperial Hwy	Bloomfield Ave	Fiber	All	All	All
Imperial Hwy	Transportation Ctr	Fiber	N/A	N/A	Major
Rosecrans Ave	Marquardt Ave	Wireless	All	All	All
Rosecrans Ave	Valley View Ave	Wireless	All	All	All

Table A-4: Paramount Signal VDS Locations

Primary Street	Cross Street	Communications	Existing Detection		Ganged?
			Presence	Advanced	
Rosecrans Ave	Orange Ave	Wireless	All	Major	Major
Rosecrans Ave	Garfield Ave (VIDS)	Wireless	All	All	All
Rosecrans Ave	Paramount Blvd	Wireless	All	All	All
Rosecrans Ave	Anderson St	Wireless	All	Major	Major
Rosecrans Ave	Downey Ave	Wireless	All	All	All
Rosecrans Ave	Century Blvd	Wireless	N/A	N/A	
Paramount Blvd	Howe St	Wireless	All	Major	Major

Table A-5: Compton Signal and VDS Locations

Primary Street	Cross Street	Communications	Existing Detection		Ganged?
			Presence	Advanced	
Rosecrans Ave	S Central Ave	Wireless	All	All	
Rosecrans Ave	Parmalee Ave	Wireless	All	Major	
Rosecrans Ave	Tajuata Ave	Wireless	All	Major	
Rosecrans Ave	Dwight Ave	Wireless	All	Major	
Rosecrans Ave	Wilmington Ave	Wireless	All	All	
Rosecrans Ave	Mathisen	Wireless	Minor	Major	Major
Rosecrans Ave	Aranbe Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Oleander Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Acacia Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Willowbrook Ave	Wireless	All	Major	
Rosecrans Ave	Alameda St	Wireless	All	Major	
Rosecrans Ave	Santa Fe Ave	Wireless	All	All	All
Rosecrans Ave	Mayo Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Long Beach Blvd	Wireless	All	All	All
Rosecrans Ave	Bullis Rd	Wireless	Minor	All	All
Rosecrans Ave	Bradfield Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Harris Ave	Wireless	Minor	Major	Major
Rosecrans Ave	Gibson Ave	Wireless	Minor	Major	Major

Table A-6: Lynwood Signal and VDS Locations

Primary Street	Cross Street	Communications	Existing Detection		Ganged?
			Presence	Advanced	
Imperial Hwy	Alameda St	Wireless	N/A	N/A	
Imperial Hwy	Fernwood Ave	Wireless	Minor	Major	Major
Imperial Hwy	State St	Wireless	Minor	All	All
Imperial Hwy	Shopping Ctr	Wireless	N/A	N/A	
Imperial Hwy	Long Beach Blvd	Wireless	All	All	Minor
Imperial Hwy	California Ave	Wireless	Minor	Major	All
Imperial Hwy	Los Flores Blvd	Wireless	Minor	Major	All
Imperial Hwy	Martin Luther King	Wireless	Minor	All	Minor
Imperial Hwy	Bullis Rd	Wireless	Minor	Major	Major
Imperial Hwy	Cornish Ave	Wireless	Minor	Major	Major
Imperial Hwy	Jackson Ave	Wireless	Minor	Major	No
Imperial Hwy	Atlantic Blvd	Wireless	All	All	All
Imperial Hwy	Duncan Ave/Wright	Wireless	Minor	Major	Major

Table A-7: La Mirada Signal and VDS Locations

Primary Street	Cross Street	Communications	Existing Detection		Ganged?
			Presence	Advanced	
Imperial Hwy	Meyer Rd	Fiber	N/A	N/A	All
Imperial Hwy	Valley View Ave	Fiber	N/A	N/A	All
Imperial Hwy	Telegraph Rd	Fiber	N/A	N/A	All
Imperial Hwy	La Mirada Blvd	Fiber	N/A	N/A	All
Imperial Hwy	Cordova Rd	Wireless	N/A	N/A	No
Imperial Hwy	Ocaso Ave	Wireless	N/A	N/A	No
Imperial Hwy	Oxford Dr	Wireless	N/A	N/A	No
Imperial Hwy	Santa Gertrudes Av	Wireless	N/A	N/A	All
Imperial Hwy	First Ave	Wireless	N/A	N/A	No
Rosecrans Ave	Biola Ave	Wireless	N/A	N/A	
Rosecrans Ave	Figueras Rd	Wireless	Minor	Major	Major
Rosecrans Ave	La Mirada Blvd	Wireless	N/A	N/A	All
Rosecrans Ave	Jalon Rd	Wireless	N/A	N/A	All

Rosecrans Ave	Adelpha Dr	Wireless	N/A	N/A	All
Rosecrans Ave	Santa Gertrudes Av	Wireless	N/A	N/A	All

Table A-8: South Gate Signal and VDS Locations

Primary Street	Cross Street	Communications	Presence	Advanced	Ganged?
Firestone Blvd	Santa Fe Ave	Wire (TWP)	All	Major	
Firestone Blvd	Long Beach Blvd	Wire (TWP)	All	All	
Firestone Blvd	Garden View Ave	Wire (TWP)	All	Major	
Firestone Blvd	State St	Wire (TWP)	All	Major	
Firestone Blvd	Elizabeth Ave	Wire (TWP)	All	Major	
Firestone Blvd	California Ave	Wire (TWP)	All	Major	
Firestone Blvd	San Juan Ave	Wire (TWP)	All	Major	
Firestone Blvd	Otis Ave	Wire (TWP)	All	Major	
Firestone Blvd	Alexander Ave	Wire (TWP)	All	Major	
Firestone Blvd	Annetta Ave	Wire (TWP)	All	Major	
Firestone Blvd	Atlantic Ave	Wire (TWP)	All	All	
Firestone Blvd	Rayo Ave	Wire (TWP)	All	Major	
Firestone Blvd	Garfield Ave	Wire (TWP)	All	All	
Firestone Blvd	Ryerson Ave	Wire (TWP) and Existing Fiber			No
Imperial Hwy	Garfield Pl	Wireless	Minor	Major	Major
Imperial Hwy	Garfield Ave	Wireless	All	All	
Imperial Hwy	Amery Ave	Wireless	Minor	Major	Major
Paramount Blvd	Main St - T	Wireless	Minor	Major	No

Table A-9: Bellflower Signal and VDS Locations

Primary Street	Cross Street	Communications	Existing Detection		
			Presence	Advanced	Ganged?
Rosecrans Ave	Lakewood Blvd	Wireless	All	All	
Rosecrans Ave	Clark Ave	Wireless	All	All	No
Rosecrans Ave	Bellflower Blvd	Wireless	All	All	All
Rosecrans Ave	Woodruff Ave	Wireless	All	All	All
Rosecrans Ave	McNab Ave	Wireless	Minor	Major	Major

Table A-10: LA County Signal and VDS Locations

Primary Street	Cross Street	Communications	Existing Detection		
			Presence	Advanced	Ganged?
Firestone Blvd	S Central Ave	Wireless	All	Major	
Firestone Blvd	Hooper Ave	Wireless	Minor	All	No
Firestone Blvd	Zamora Ave	Wireless	Minor	Major	No
Firestone Blvd	Compton Ave	Wireless	Minor	All	No
Firestone Blvd	Maie Ave	Wireless	Minor	Major	No
Firestone Blvd	Graham Ave	Wireless	Minor	Major	No
Firestone Blvd	Holmes Ave	Wireless	Minor	Major	No
Firestone Blvd	S Fir Ave	Wireless	Minor	Major	No
Firestone Blvd	Ivy St	Wireless	Minor	Major	No
Firestone Blvd	Alameda St	Wireless	All	Major	All
Imperial Hwy	S Central Ave	Wireless	N/A	N/A	
Imperial Hwy	Compton Ave	Wireless	N/A	N/A	
Imperial Hwy	Wilmington Ave	Wireless	N/A	N/A	
Imperial Hwy	Mona Blvd	Wireless	N/A	N/A	
Imperial Hwy	Shoemaker Ave	Fiber	N/A	N/A	All
Imperial Hwy	Leffingwell Rd	Fiber	N/A	N/A	Major
Imperial Hwy	Carmenita Rd	Fiber	N/A	N/A	All
Imperial Hwy	Marquardt Ave	Fiber	N/A	N/A	Major
Rosecrans Ave	S Broadway St	Wireless	N/A	N/A	
Rosecrans Ave	Main St	Wireless	N/A	N/A	
Rosecrans Ave	San Pedro St	Wireless	N/A	N/A	
Rosecrans Ave	Avalon Blvd (consider VIDS)	Wireless	N/A	N/A	
Rosecrans Ave	Stanford Ave	Wireless	N/A	N/A	
Rosecrans Ave	Aprillia Ave	Wireless	N/A	N/A	
Rosecrans Ave	Atlantic Ave	Wireless	N/A	N/A	